Report of the Joint Continuing Committee for Scientific Cooperation:

Ministry of Science and Technology
Republic of Korea and
National Academy of Sciences
United States of America

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Staff Summary Report of First Meeting and Workshop

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This report is a staff-prepared summary of the first meeting and workshop of the Korea - U.S. Joint Continuing Committee for Scientific Cooperation, held in Seoul, Korea, November 13 - 16, 1973, under the joint auspices of the Board on Science and Technology for International Development of the National Academy of Sciences and the Ministry of Science and Technology, Republic of Korea. Participation by the National Academy of Sciences was made possible through funds provided by the Office of Science and Technology, Bureau for Technical Assistance, Agency for International Development under contract AID/csd-2584, Task Order 1.

A list of background papers presented at the workshop is appended to this report.

This is the second reproduction of the report produced earlier in 1974.

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I

INTRODUCTION

In response to a request by the Ministry of Science and Technology (MOST) of the Republic of Korea, the National Academy of Sciences (NAS) has joined with the ministry in establishing a Korea - U.S. Joint Continuing Committee on Scientific Cooperation. The first general meeting and a workshop of the joint committee took place in Seoul, 13 - 16 November 1973. This report gives a brief account of the events that led to the formation of the joint committee, describes the proceedings of the November meeting and workshop, and summarizes the resulting conclusions and recommendations.

The NAS's involvement with science and technology in Korea began in 1969, when the USAID mission in Korea, anticipating a phaseout of U.S. aid in Korea by 1972, asked the NAS to advise them what to do to ensure continued Korean access to U.S. technical resources in support of development objectives. An ad hoc panel of five persons, under the chairmanship of Walter Orr Roberts, visited Korea in July 1969 and submitted a report to AID that identified Korean long-term needs for technical assistance, recommended mechanisms for transferring technical assistance, and suggested cooperative linkages

between U.S. and Korean institutions. The aid program in Korea subsequently was extended, however, and the panel's recommendations have not been implemented.

In 1971 the NAS was asked to review the 5-year plan for science and technology prepared by MOST. The AID mission in Korea provided financial support. In January 1972 a three-man panel--Dr. Roger Revelle (chairman), Harvard University; Dr. Franklin Long, Cornell University; and Dr. Hubert Heffner, Stanford University visited Korea for 2 weeks of discussion with Korean colleagues. The group prepared a report to the Minister of Science and Technology and to AID on

- the organization and activities of the Ministry;
- the Ministry's role in strengthening universities;
- problems of scientific and technical manpower;
- ways of strengthening particular research institutions;
- the characteristics of a possible Korean support agency for research and graduate education in science and technology.

The Minister of Science and Technology, Dr. Choi Hyung Sup, felt that the perspective of a group such as the 1972 NAS panel played a valuable catalytic role in the consideration of problems of science and technology in relation to Korean development. When Dr. Choi visited the United States in late February 1973, he discussed with NAS officials the ways in which the resources of the NAS could be made available to MOST in a continuing way. The Sino-American Science Cooperation Committee, jointly sponsored by the NAS and the Academia

Sinica of Taiwan, was mentioned as one possible model, and Dr. Choi was greatly interested in the concept. After further correspondence between the Minister and the NAS Foreign Secretary, Dr. Harrison Brown, the NAS and MOST agreed to establish a Korea - U.S. Joint Continuing Committee for Scientific Cooperation.

The main purpose of the program of scientific cooperation is to provide AID and Korean authorities with recommendations on specific application of science and technology to economic and social development. The kinds of issues likely to be considered are

- the development of long-range policy for science and technology;

- the governmental structure for science and technology;

- national needs and priorities for research and development in specific economic sectors; and

- policy and educational issues related to scientific and technical manpower needs.

NAS participation in the joint committee will consist of about five scientists and engineers with wide experience in both specific disciplines and the problems of public policy for science and technology. The NAS committee members will be asked to serve for periods of 2 or 3 years to provide continuity. Other participants may be co-opted by the committee for specific meetings when other expertise is needed.

In addition to consideration of the overall prospects and plans for science and technology, MOST would also like

to have outside views on institutional needs and the application of science and technology to development of particular sectors. In this regard, one function of the joint committee will be to recommend topics or problem areas that seem to call for the kind of in-depth scrutiny possible through workshops or study groups. These specific, intensive activities will be held as needed and as possible; the joint committee will meet regularly, probably on an annual basis. Frequently, of course, it may be practical to schedule the joint committee meeting in conjunction with a workshop or similar activity.

The activities of the Joint Committee are very much in harmony with Korea's science and technology development policies for the 1970s. These policies are part of the nation's ambitious development goals expressed in the Third Five-Year Plan, which stresses three major aims:

1. The development of heavy industry and chemical industry;

2. Substantial increase in exports; and

3. Major increase in agricultural and fisheries production.

Development of the chemical and heavy industries foresees a shift in proportion of GNP attributable to the manufacturing and mining section from 24.3 percent in 1972 to 34.7 percent by 1981. The drive for more exports envisions an increase from 1.6 billion dollars in 1972 to 10.9 billion dollars by 1981. Agricultural improvements are expected to produce

self-sufficiency in food products by 1981. Attainment of these major development goals, then, should result in a 1981 per capita income of $1,000, compared to the 1972 figure of $302.

Clearly, the economic development goals to which the Government of Korea is committed will be attained only with a high level of technical innovation and performance which is dependent, in turn, on a strong indigenous capability in science and technology. As the key agency charged with planning and stimulating the country's scientific and technological development, MOST has articulated a policy with the following essential components:

1. The establishment of a broad, firm base of fundamental knowledge and research creativity in science and technology. It will be of primary importance to identify and encourage individuals whose exceptional intellectual potential can contribute most to this goal.

2. The development of an experienced and indigenous capability in the technologies of strategic industries for the support of heavy and chemical industry.

3. The promotion and establishment among the general public of science and technological performance-oriented attitudes and understanding to insure an environment of universal enthusiasm and support for development goals.

It is worth noting that the importance of science and technology to Korea's development is recognized and supported at the highest level of the government. In his 1973 New Year

press conference, President Park Chung Hee said:

> I believe that everybody must learn, familiarize himself with, and develop a scientific way of life. Only then will our national strength surge ahead rapidly. Without scientific skills we absolutely cannot be an advanced nation.

Within the context of Korea's ambitious goals for economic and social development, strengthening the nation's indigenous scientific and technological capability is essential. The Koreans themselves are taking important and substantial steps in this direction, but it will be vital for them to maintain good channels of information-and-advisory services with scientific and technical institutions outside Korea. The formation of the Joint Continuing Committee of the NAS and MOST establishes one of these key external linkages.

II

OBSERVATIONS AND RECOMMENDATIONS

The NAS-AID project agreement memorandum describing the proposed first meeting of the Korea - U.S. program of cooperation suggested that

> The NAS-MOST joint meeting will lay essential groundwork for a joint program of scientific cooperation by identifying scientific and technological issues and problems related to Korea's development which will benefit from more detailed analysis and consideration. The meeting will address the manner in which detailed consideration of these topics can be carried out most effectively. Participants in the joint meeting will also recommend operating mechanisms suitable to a continuing NAS-MOST cooperative program and ... consider possible methods and sources of financial support.

The workshop topics were selected by MOST and reflect issues and areas of concern to which the Ministry assigns high priority in Korea's scientific and technological development. In terms of the overall objectives of the first meeting, the topics were well covered. In some areas, it was agreed that the NAS group could not make a further substantial contribution. In others, it was agreed that the topic was of sufficient concern, and the resources of the NAS appropriate, for more intensive consideration in the future.

Members agreed on the value of an annual joint committee meeting to consider the broad perspective of science, technology,

and development in Korea and identify specific topics meriting more intensive deliberation through workshops, study groups, or other activities. Committee members agreed that the next two activities in the program of scientific cooperation should be two workshops, the first on energy and the second on marine resources, and that a 1974 meeting of the joint committee might be held in conjunction with one of the workshops. Finally, members discussed the financial support of activities in the cooperation program and asked staff members of MOST and the NAS to explore possible sources of support in Korea and the United States and to maintain close liaison on this matter.

Since the objective of the November workshop was a preliminary exploration of the suitability of topics for further study, rather than on in-depth deliberations, the committee formulated no specific action recommendations. A valuable exchange of information and suggestions took place between the Korean and U.S. participants, however, and the NAS panel members prepared a series of brief observations on potential workshop topics and related subjects. Excerpts from these observations are given in the following sections on the four workshop sessions.

1. National Energy R & D Policies

Korea's energy consumption has increased at an average annual rate of 10.4 percent during the period of the Second

Five-Year Economic Development Plan. The consumption pattern, based on coal before 1969, has changed so that petroleum products accounted for over 52 percent of national energy consumption by 1972. Because of limited indigenous energy resources, Korea's import dependence for energy was 52.3 percent in 1973. Along with rapid economic growth over the past decade, Korea's per capita energy consumption almost doubled from 1962 to 1972, and total energy demand by 1981 is predicted to become 2.6 times the annual demand in 1972.

Korea's development plans center on accelerated industrialization, particularly in the heavy and chemical industries. Energy demands will grow ever higher in the coming 20 years, while at the same time, world competition for scarce energy resources will be increasingly vigorous. More than most developing countries, Korea's economic and social development relies on the availability of adequate energy sources.

Workshop discussion focussed on Korea's nuclear-power-plant strategy in view of worldwide scarcity in energy resources, and also explored broad research and development activities. NAS panel members suggested that national energy strategy might include alternative models of the economic development plan. As an example of alternatives, it was suggested that a high-consumption project such as an aluminum plant might be postponed in favor of a lower-consumption industry, or that approval for such a high-consumption plant might be withheld unless

the plans provided for an internal power plant. Panel members also commented on Korea's present electric-power-utilization voltages (100/200) and suggested that the most serious consideration should be given to the possibilities of conversion to the IEC standard voltages (220/380).

The Korea Atomic Energy Research Institute (KAERI) has overall responsibility for the government's energy R & D efforts. The NAS panel members had these comments on the energy program at KAERI:

> The new broadened assignment to the previous Atomic Energy Research Institute of responsibility for R & D efforts and studies for all varieties of energy seems particularly timely. Since the program is in its formative stages, with explicit efforts still to be defined and with the majority of the new staff still to be hired, it was an especially good topic for discussion by the Joint Advisory Committee.
>
> It is clear that the area of principal initial effort by KAERI will be nuclear energy. In view of KAERI's history and in view of the imminence of new nuclear power generators within Korea, this seems entirely sensible. On the other hand, the problems involved here go much beyond R & D as sometimes defined, to include such topics as government policies on power plant siting, selection of the types of commercial nuclear power reactors, ultimate concern about the sources of uranium, and about fuel processing. It seems very likely that KAERI will need to set up task forces on a number of these topics and reach out beyond its own staff in obtaining people for these task forces. What will be required is a very clear understanding of the total system involved, including particularly the operating problems, backed by an integrated approach to the various problem areas. Clearly, the Korea Electric Company will play a large role in these developments, and the problem of effective working relations between KAERI and KECO is critical.

The second area into which KAERI will probably wish to expand as rapidly as possible is that of energy from coal. Not only is the price structure likely to make energy from coal relatively more favorable, but the threat of loss of Mideast oil supplies makes it almost mandatory to bring the coal effort to a high level of capability.

Some major policy questions are involved here. Will there be changes in the way coal is mined? Will one attempt to build power plants at the mine head? How will transportation of the energy be done? Through electric power transmission lines, through pipelines as gas or even coal slurry, or by railroad? Is there a case to be made for coal gassification and a gas distribution system?

Once again, answers to these questions go well beyond ordinary technical R & D and will almost surely involve team efforts by economists, planners, transportation experts, mining experts, etc. What KAERI can ask for is the opportunity to participate in these studies in order to identify technical opportunities or technical bottlenecks. Then, once policy at least is tentatively established, KAERI can turn to research and development in the indicated areas knowing that the R & D has a high probability of being useful.

There are a number of sophisticated possibilities for new energy sources where KAERI will almost surely decide that it is inappropriate to do very much R & D itself, and that the correct position is one of maintaining close contact with the fields as they develop in other countries. Examples are the development of a fast-breeder reactor, programs heading toward thermofusion power, and "dry rock" geothermal power. It would probably make sense to establish an Advanced Energy Systems Team, which was charged to go visit facilities dealing with these various topics, find out what the state of the effort is, and then make plans for periodic visits and information exchange to keep abreast. Another possibility would be to send a KAERI scientist or engineer abroad for a year to work directly in a fast-breeder or other program of great interest. This would develop expertise and serve also to bring back firsthand information on difficulties, program directions, etc.

What about the several interesting special energy sources with possible application to specific areas or problems? These include wind energy, solar energy, tidal energy, fuel cells, and the like. One or two of these may have special relevance to Korea and may justify an "in-house" KAERI program. In other cases, especially where interesting ideas have surfaced, KAERI may find it preferable to award study contracts to scientists at KIST or KAIS. These outside scientists and engineers could explore specific leads, or, as in the case of solar energy design, low-cost trial units. They could at the same time provide a "window" to the work going on the other countries. At the early stage of these new efforts some team visits to laboratories of other countries would probably also be helpful. Finally, in these areas, also, collaboration between KAERI and agencies of other ministries will be almost mandatory. It may for example eventuate that the most promising application for solar energy will be for some agricultural use.

The problem of establishing proper priorities and specific R & D programs within these several areas is a difficult one and one of the recommendations of the Joint Advisory Committee is that a special group of U.S. and Korean experts be convened in the near future to address this problem of program priorities.

Finally, it should be noted that the broadened assignment to KAERI also includes new responsibility for R & D on problems relating to pollution. The U.S. participants of the first joint session did not give any time to this problem area and have no comments to make except that this perhaps may be an interesting topic for a subsequent meeting of the Joint Advisory Committee.

2. Development of Ocean Resources

One of the background papers prepared for the workshop stated:

> Although Korea's broad continental shelf, numerous estuaries, and semi-enclosed waters are already the site of extensive fishing and aquaculture, there are many scientific indications which support the idea of large unexploited resources....

The paper discussed possibilities of oil and gas formations, considerably increased yield of living resources, the question of possible tidal power generation, and went on to say;

> In spite of the resources, development efforts have heretofore been sporadic and uncoordinated, and call for greatly intensified comprehensive activities.

Realizing the need for greater coordination of marine research and development activities, MOST has formulated a long-term plan for marine-resource surveying and development for the period 1971 - 1980. A key part of this plan calls for the establishment of a coordinating institution, the Korea Ocean Research and Development Institute (KORDI).

In commenting on the current situation of the marine sciences in Korea, the NAS panel members noted that they were impressed with the determination of the Korean government to foster the growth of marine sciences. This growth is needed because, at present, the equipment and facilities available for basic marine-science research are poor, and there is a problem of scientific personnel, including a shortage of well-trained marine scientists and low salary levels.

Further comments by the panel follow:

> The apparent intention of the Ministry of Science and Technology (MOST) to support oceanographic development through establishing a prestige institute (Korea Ocean Research and Development Institute, KORDI) for marine sciences is encouraging. It is obvious that rapid development of oceanography in Korea can only come with government support and well-developed priorities, appropriate to the country's needs. From visits to universities and field stations in Korea, it is apparent that labs and facilities provided by external sources have

often been inappropriate to Korea's needs, and cannot be maintained or operated adequately. A well-articulated national plan is essential for proper development of Korean oceanography. It seems that MOST is well along in this respect.

A major effort is needed to upgrade marine sciences in Korean universities. This effort should include training and retraining of university and college faculties through degree-related studies and refresher courses abroad, through increased research support to faculty members, and a pooling of marine science talent in the universities, government agencies, and KORDI.

KORDI possibly could serve as a focal point and integrating mechanism for an interdisciplinary approach to marine sciences. Also, KORDI could provide support to graduate programs at the universities. The universities, on the other hand, should provide the multidisciplinary training and research in the ocean sciences. The two major university programs (Seoul National University, SNU; Pusan Fisheries College, PFC) should have priority areas for growth in those disciplines that fit with existing competence. One possibility would be to emphasize geological and geophysical aspects at SNU, biological and physical oceanography at PFC and more theoretical studies at KORDI.

Panel members also called attention to another aspect of Korea's marine environment:

Owing to its position between the Sea of Japan and the Yellow Sea and its rapid industrialization, Korea is an attractive location for monitoring the marine environment. Korea's position and oceanographic potential should be specifically recognized in the developing Earthwatch program of the U.N. Environmental Program. A well-supported marine monitoring program might be a useful way to upgrade oceanography in the country.

Finally, both Korean and NAS participants in the workshop agreed with the points in the following statement:

After hearing reports of five different ministries and discussing their interrelationships on development of ocean resources, both Korean and U.S. counterparts recommend that the Joint Continuing Committee for Scientific Cooperation organize an in-depth Workshop on Marine Resource Development. The proposed workshop should be long enough

to permit inter alia a full discussion of long-range plans and activities of the ministries, and possibly industries, involved in marine science and technology and to permit visits to major installations, facilities, and ancillary groups.

Participants recommended that a second workshop be convened in spring 1974 for early consideration of plans for development of KORDI and that a joint steering committee be established soon to plan the workshop, with consultation between Korean and U.S. joint committee members and consultants. The committee identified the following among the possible agenda items:

- Facilities for marine resource development, including technological trends
- Goals for Korean marine science and technology
- Coordination mechanisms for marine-science development
- Data stores: National Ocean Data Center

  Condition of existing data bases

  Data management for scientific use and resource development and management
- Ocean-science policy

  Marine law

  Economics of marine resources

  Oceanography - marine meteorological interactions
- Manpower questions

  Training and retraining

  Utilization

  Exchange of scientists between the United States and Korea

The suggested agenda items are meant to address the topic of ocean resources broadly and to include fish and fishery programs as well as oceanography and mineral resources.

3. Role of Academia in National Development

The NAS panel members commented on this topic as follows:

The higher education establishment of Korea has become large and effective, but nevertheless remains in a state of considerable flux and change. One priority problem is how to obtain even larger contributions from the universities to the greater program of Korean development. Higher education's appropriate role in Korea's further development may be less a planning or organizational problem and more a resource and pedagogical one.

One problem is to develop the new curricula needed to train students, especially those in science and engineering. It is generally agreed that a principal need is more orientation toward problem solving with increased emphasis on laboratory work and field experience. Greater emphasis on the development problem itself is probably also required. This would involve new multidisciplinary teaching programs as well as new research efforts. Field experience for the students could be particularly valuable.

Clearly, the universities need substantial infusions of money, directly applied on a merit basis, to attract and hold highly competent faculty and graduate students to both increase direct national research capabilities and improve the quality of education. High-quality faculty will need the facilities and equipment necessary to do a first-rate job. The new, autonomous institutions such as KIST and KAIS cannot produce better quality by themselves; the universities and government departments must accept their own role in this process.

Mid-career training and training in scientific and technological planning, policymaking, and management are much needed, but the model is not (with all due respect to U.S. experience) readily at hand. Two key elements are essential: (1) appropriate university-based educational institutions (which means very sophisticated interdisciplinary faculties of high intellectual caliber and experience in real-world jobs) and (2) a career-management concept for key career people in all the relevant ministries (not only MOST, but also agriculture, commerce, etc.) with emphasis on mobility, periodic training opportunities (including second and third degrees), foreign travel and internships, etc.

In the light of these needs, the proposal for a new Korea National Science Foundation carries a strong note of importance and urgency. Such a foundation could play a large role in identifying the most able university scientists and engineers and in supporting their further development. It could also greatly increase the quality of graduate education in science and engineering. The basic and applied research that would be done with foundation support could be useful in its own right and as a part of a window to the world's output of research.

The discussion of this foundation revealed the need for a greater emphasis on the proposal, for more consideration of the various models available (U.S., German, etc.), and for a clearer definition of the goals and priorities involved. However, there was general agreement on the importance of the need for new efforts in science education and on the potentially useful role a foundation could play. The decision, therefore, to suggest this general topic for the agenda of the next meeting of the joint committee was a welcome one. Further correspondence should permit a sharpening of the topic and should help identify the most useful discussants from Korea and the United States.

4. The Kwa-Hak-Hwa Movement

Science and technology are important instruments in the economic and social development of Korea, a highly traditional and nontechnological society. The Kwa-Hak-Hwa movement is an attempt to accelerate modernization; several Korean participants translated the term as "the scientification of the people."

A background paper on the Kwa-Hak-Hwa movement described three major objectives. One is to encourage people "to understand the importance of science and technology in economic development and develop the habit of applying even elementary

technical knowledge to their daily lives." A second objective, in light of a 17.5 percent annual increase in industrial demand for skilled labor, is "to encourage the attainment of technical skill by everyone in the country." The third objective aims at the strategic development of particular industrial technologies. The methods for achieving these broad objectives include mass media programs, improvements in basic scientific and technical education, certification of various levels of skilled craftsmanship, rural-technology extension programs, and attempts to raise the status of scientific and technical personnel.

General comments by NAS panelists on the Kwa-Hak-Hwa movement follow:

> Clearly, an effort of this breadth will require the utilization of all available mechanisms for dissemination. The agricultural extension service should surely be used in rural areas, and similar extension services may be available for urban communities. With extension workers and similar groups, the principal problem will be "who will teach the teachers?" In other words, who will prepare textual material and the kits of practical material and information which one wishes to dispense to the communities? This in itself could be a major effort and probably calls for an interministerial advisory group to assist people from KIST to prepare kit materials.
>
> There is very probably a role here for demonstration or "pilot" programs, in which a proposed program is tried out on a limited group to test its efficiency. One suspects that two demonstration programs may be needed, one at the community level in rural areas, and one in an urban area.
>
> In planning these programs, and especially in carrying out pilot and demonstration efforts, it might be wise to enlist the assistance of university groups. University professors from various fields could combine in

developing a program and supervising it. University student teams could undoubtedly be hired at modest wages to work during summers helping to develop the program and acting as preceptors and examples. The idea of using teams of students for efforts of this sort is an old one and has recently been used extensively by the Chinese. In a sense, the VISTA and Peace Corps programs of the USA may be comparable.

In efforts of community development one can be skeptical of too much reliance on volunteer effort. Programs of this sort require continuity if they are to be effective, and some formal commitment of workers seems essential.

It would probably also be wise not to "oversell" the special role of science and technology. An understanding of science and technology is clearly important, and they do have a role in developing a better life, but so do other kinds of knowledge. A community will find some of its most important new directions in better village governance, in a better understanding of economics, in establishment of effective farm or fishery cooperatives, etc. Hence, the importance of bringing science and technology together with other disciplines in developing a total program. This is not to deny the utility of a mass-media information program on science and technology, it is only to say that at the applications level an interdisciplinary, problem-oriented approach will probably be more effective.

Science Town

Closely related to the purposes of the Kwa-Hak-Hwa movement is a government plan to build a "science town" on a 6,000-acre site at Dae Duk, just north of the city of Taejon. Taejon, about a 2-hour drive south of Seoul, is the major commercial center of the area and has a national university. An NAS panelist's comments on the project follow:

The Dae Duk Science Town plan is a bold and ambitious undertaking to create a complete research and development community consisting of laboratories and central supporting services, residences, and basic community facilities. By Presidential decree and pronouncements from MOST, the government is officially and publicly committed to develop Dae Duk, and the necessary legal steps have been taken to preserve the land for this purpose.

...[At] the Dae Duk site, shoulders extending from the mountainous ridge divide the land into seven or eight natural development areas. Plans now being developed contemplate using one of these sites for relocating the university, which presently is in Taejon, and utilizing the most centrally located area for the community center (central service facilities, schools, and shopping). The development of the other sites would begin with construction on each of one of the planned new institutes (shipbuilding, oceanography, mechanical industries, petroleum, and electronic communications). Each of the areas is of such size that it can accommodate additional government and industrial facilities as Dae Duk grows in the future, and access to all sites will be provided by inner and outer "loop roads."

The development of a "science town" of this magnitude would be an ambitious project in the most advanced, high-technology countries, and, at this time, many important aspects of the Dae Duk plan have been considered in only general terms (for example, the administrative structure for providing central services). Therefore, the safest reaction would be one of skepticism and doubt.

However, there are significant factors in the Dae Duk plan which lead to a different conclusion. The Government of the Republic of Korea, by commiting itself to the Dae Duk Science Town, has made the project a key element in the Kwa-Hak-Hwa Movement, and its failure would undermine the credibility of the government's dedication to the use of science and technology for economic development, as well as raising questions regarding the judgment and plans of MOST.

Therefore, it can be assumed that the commitment itself will force the Dae Duk project to proceed, with the only questions being those of timing, scale, and quality. Development of Dae Duk as a "Science Town" will require a major allocation of financial resources, and even though

the government has the authority to create new institutes at Dae Duk or to move existing agencies here, its ultimate success will depend on making it the most appealing place for scientific and technical personnel to pursue their careers and raise their families. From the very beginning, therefore, each step in the development should have the objective of establishing an unmatched level of quality and prestige. Since education is a high priority for professional families, it will be important to provide, in addition to good salaries and residences, first-rate schools even before they can be justified by the size of the population. It probably will be important to instill, in the staffs of the first institutes, a sense of pride in building something new and important, but the ultimate objective should be the creation of a total working-living environment so attractive and prestigious that the research personnel would feel sorry for their friends who remain in Seoul.

If Dae Duk develops as presently envisioned, it could produce side benefits, 20 or 30 years from now, even more important than the contributions to industrial development of its new research institutes. As a community of highly educated, professional families, it would influence the social and cultural development of the surrounding area. And if, with the help of the senior staff of institutes at Dae Duk, the university which is to be moved from Taejon could be developed to first-rank status, the effect could be the creation, at Dae Duk-Taejon, of a second national center of intellectual activity. This, in itself, might be worth the investment and effort.

The investment in Dae Duk, however, must be considered a long-term investment and no attempt should be made too quickly to measure its impact on national development. Because of the time schedule for site planning and preparation and construction of buildings for the first institutes, Dae Duk will have no effect on attainment of the third 5-year-plan goals and relatively little on the fourth. At the earliest, its impact would begin at the very end of the 1970s, but if successful, its value would then be continuous and enduring.

Industrial Perspectives

In considering the critical contribution of science and technology to Korea's development, a variety of industry-related questions naturally arose. Some general comments were made by NAS panelists on MOST's role as a catalytic agent in industrial development:

> In any successful industrialized society, both the agencies of government and the departments in industry provide strong evidence that technology is diffused throughout the matrix of internal organization. In the Korean model, one notes that MOST has a good concentration of scientific talent. Clearly the prime objective of MOST must be to continue to develop a broader and stronger base of scientific brainpower and facilities. Simultaneously, MOST has to be concerned with the ways and means of diffusing hardware, information, and scientific talent throughout the agencies of government. Further, because of the undeveloped status of indigenous Korean industry, MOST has to be concerned with the ways and means of providing technical support services to the industrial sector in addition to the R & D services that KIST [Korea Institute of Science and Technology] provides at the present time.

With respect to the provision of services related to industry, panel members commented favorably on the plans to strengthen technical education. The importance of maintaining a strong and effective program at the Korea Advanced Institute of Science (KAIS) was stressed, as was the value of KIST as an agent for the innovation, adaptation, and dissemination of industrial technologies.

Some concern was expressed that perhaps greater attention should be given to the development of technical support services needed by industry. Panel members commented:

It must be appreciated that the magnitude of technical support services is as large (if not larger) than that of direct services. For example, in some high-technology heavy industry, the ratio of paraprofessional/professional may be as large as 10/1. Because of the magnitude of this concern, perhaps more emphasis should be placed upon this point at some future time.

Listed below are six areas that should be investigated further with the intent of ascertaining a role for MOST. Clearly one should avoid the error of concentrating, for example, on training airline pilots and designing airplanes only to find frustration in a lack of mechanics and technicians to keep the plane in top condition. The suggested areas of concern are

1. Technical management
2. Corps of paraprofessionals
3. Documentation, control, dissemination of information
4. Industry standards
5. Centralized computer data banks
6. Patents

Comments were also made on Korea's structure for making and maintaining industrial standards:

The Industrial Advancement Administration (IAA) appears to have a sound structural organization format. The fact that it is in another ministry simply reflects a reasonable notion that such a function is quasicommercial. Nonetheless, standards, weights, measurements, and test procedures are unquestionably technical-based functions. From this it appears that MOST should want to establish a legal (bound by law to consult MOST) relationship with IAA. There is concern that a nonscientific orientation would mean disaster for Korean technology. After all, standard units and practices are the very spine of technology.

To augment this point, one should recognize that in the U.S. models, the American National Standards Institute and the Bureau of Standards are quite different from Underwriters Laboratories (UL). And further, UL is quite different from the industry standards associations, such as

NEMA - National Electrical Manufacturers Association
NMTBA - National Machine Tool Builders
JIC - Joint Industry Council
EIA - Electronic Industries Association

Clearly, this is only a partial listing, and MOST should study the fact that there are at least four kinds of standards entities:

- Governmental
- Private commercial
- Industry, self-regulating
- International

It is strongly suggested that this matter be studied with the understanding that MOST will have to innovate a system to meet the unique needs of Korea. It is equally important that MOST assume an aggressive stance in keeping Korea abreast of the activities and developments within international standards formulating bodies such as IEC.

III

AGENDA AND PARTICIPANTS

Agenda

The agenda of this inaugural meeting of the Korea - U.S. Program of Scientific Cooperation was built around two basic elements: (1) formal sessions of the joint committee and (2) workshop discussions on four major topics. The distinction between these two elements was more in form than in function: members of the joint committee actively participated in workshop discussions, and workshop participants were observers at the joint committee sessions.

For the NAS panel members who arrived in time, briefing visits to industrial sites were provided on November 12. The first full day of scheduled activity, November 13, was devoted to briefing sessions and visits and the opening meeting of the joint committee. The final three days, November 14 - 16, were taken up with workshop discussions and the closing joint committee meeting.

The actual schedule was as follows:

Monday, 12 November 1973

AFTERNOON	Industrial visits:
	- Korea Electric Company
	- Dae Han Electric Wire Company, Ltd.

Tuesday, 13 November 1973

MORNING	NAS Panel call on Director of USAID/Korea
	NAS Panel call on Minister of Science and Technology
	Briefing by MOST officials on major science and technology policies in Korea
	First meeting, MOST-NAS Joint Continuing Committee
	Luncheon by Minister of Science and Technology
AFTERNOON	Background visits:
	- Korea Atomic Energy Research Institute (KAERI)
	- Korea Advanced Institute of Science (KAIS)
	- Korea Development Institute (KDI)
	- Korea Institute of Science and Technology (KIST)
	Reception by President of KIST

Wednesday, 14 November 1973

MORNING	Discussion on the Kwahak-hwa movement
	Luncheon by President of KAIS
AFTERNOON	Continuation of morning discussion
	Discussion on national energy research and development policies
	Dinner by President of KAERI

Thursday, 15 November 1973

MORNING	Continuation of discussion on energy R and D policies
	Luncheon by NAS panel
AFTERNOON	Discussion on development of ocean resources

Friday, 16 November 1973

MORNING	Discussion on the role of academia in national development
AFTERNOON	Final meeting of MOST-NAS Joint Continuing Committee
	NAS panel meeting with Minister of Science and Technology
	Dinner by Vice-Minister of Science and Technology

Saturday, 17 November 1973

MORNING	NAS panel call on Director of USAID/ Korea

The two meetings of the Joint Committee were cochaired by the respective chairmen of the Korean and U.S. panels. Workshop sessions were also jointly chaired, with different cochairmen for each of the four main topics.

Workshop sessions were started with summaries of briefing papers prepared by various Korean participants. (See Appendix A for a complete list of briefing papers.) About one fourth of a specific session was alloted for background presentations, the rest to general discussion of the topic.

The NAS panelists whose professional backgrounds were not especially germane to particular workshop topics used the alloted time to make supplementary visits and hold discussions within their areas of special competence. The institutions and persons they visited included

- Industrial Advancement Administration
- Bureau of Atomic Energy, MOST
- National Fisheries Research and Development Agency, Ministry of Agriculture
- Oceanography Department, Seoul National University
- Pusan Fisheries College and Marine Lab
- Marine Geology Division, Ministry of Commerce and Industry
- Hydrographic Office, Ministry of Transportation
- Planners of Dae Duk Science Town
- Director of KAERI

Workshop sessions usually began at 9:30 a.m. and ended at 5:30 p.m. Luncheons and dinners provided by the heads of several scientific institutions were generally informal and conducive to continuing the discussions begun during the workshop sessions.

Participants

NAS Panel Members

Franklin A. Long
Director, Program on Science, Technology, and Society
Cornell University
Ithaca, New York, Panel Chairman*

Brewster C. Denny*
Dean, Graduate School of Public Affairs
University of Washington
Seattle, Washington

David E. Ford, Jr.
Manager, Industrial Control Development
Allen-Bradley Company
Milwaukee, Wisconsin

M. Grant Gross
Head, Oceanography Section
Division of Environmental Sciences
National Science Foundation
Washington, D.C.

George R. Herbert*
President
Research Triangle Institute
Durham, North Carolina

Philip N. Powers
Director, Energy Engineering Center
Institute for Interdisciplinary Engineering Studies
Purdue University
West Lafayette, Indiana

Norman J. Wilimovsky
Professor of Fisheries
Institute of Animal Resource Ecology
University of British Columbia
Vancouver, B.C.
Canada

*Members of Joint Committee. (Dr. Roger Revelle, Harvard University, has also been named a member of the joint committee, but was unable to attend the November meeting.)

Korean Members of Joint Committee

Choi Sang-Up
Vice President
Sogang University, Chairman

Kim Hi-Chul
Dean, College of Engineering
Seoul National University

Joseph D. Park
President
Korea Advanced Institute of Science

Ahn Se-Hee
Dean, Graduate School
Yonsei University

Yoon Young-Ku
President
Korea Atomic Energy Research Institute

Lee Hahn-Been
President
Soong Jun University

Chun Sang-Keun
Director General, Office of Policy and Planning
Ministry of Science and Technology

Choi Jong-Wan
Administrator, Industrial Advancement Administration
Ministry of Commerce and Industry

Hahn Sang-Joon
President
Korea Institute of Science and Technology

The chairmen of the various sessions were as follows:

Meetings of Joint Committee -- Dr. Choi Sang-Up and Dr. Franklin A. Long

Workshop Sessions

- The Kwahak-hwa Movement -- Dr. Lee Hahn-Been and Dr. Franklin A. Long
- National Energy P & D Policies -- Dr. Yoon Young-Ku and Dr. Philip N. Powers
- Development of Ocean Resources -- Dr. John Yong-Won and Dr. M. Grant Gross
- Role of Academia in National Development -- Dr. Choi Sang-Up and Dr. Brewster C. Denny

Organizing Committee for the November Meeting

Chairman:	KIM HYUNG KI, Director, Technical Cooperation Bureau, Ministry of Science and Technology
Members:	CHANG SANG KWON, Chief, Bilateral Cooperation Division, Ministry of Science and Technology
	CHANG KI HOON, Chief, Multilateral Cooperation Division, Ministry of Science and Technology
NAS Staff Representative:	JOHN HURLEY, Professional Associate, Board on Science and Technology for International Development, National Academy of Sciences
Advisor:	NEWMAN A. HALL, Science Advisor, USAID, Korea

Workshop Participants

A complete list of workshop participants is provided in Appendix B.

IV

HIGHLIGHTS AND COMMENTS

Planning and Preparation

The Governing Board of the NAS approved the establishment of a program of scientific cooperation with MOST at a meeting on 21 April 1973. Shortly thereafter, the BOSTID staff instituted regular correspondence with MOST on the inaugural meeting of the program. The staff coordinator for the NAS was John Hurley, Professional Associate, BOSTID; Kim Hyung Ki, Director, Bureau for Technical Cooperation, was in charge of organizational matters for MOST.

In early July, 1973, AID's science advisor in Korea, Newman Hall, visited Washington. During his stay, Dr. Hall conferred with BOSTID staff members to bring them up to date on MOST's plans and suggestions for the first meeting. The remaining consultations on meeting plans between MOST and the NAS were conducted by letter and cable. In November, Mr. Hurley arrived in Seoul several days before the meeting to go over final arrangements with Mr. Kim and other MOST officials.

The NAS panel was selected by September, and a briefing meeting for the group was held in Washington on 2 November 1973.

A selection of background documents was provided to the panel members before the meeting, including drafts of several background papers to be presented by Korean participants at workshop sessions. The agenda for the briefing meeting was as follows:

1:00 p.m.	- Remarks by Victor Rabinowitch, Staff Director, Board on Science and Technology for International Development, NAS, on NAS programs with developing countries. Description of Continuing Committee for the Sino-American Science Cooperation, a model in many respects for the NAS-MOST program.
	- Remarks by William Littlewood, Associate Director (Science), Office of Science and Technology, AID, on AID's program of science and technology in relation to developing countries.
2:00 p.m.	- Remarks by Howard F. Newsom, Deputy Director, Office of Korean Affairs, State Department, on Korea's economic and social development.
3:00 p.m.	- Remarks by Franklin A. Long, Chairman of NAS panel, and joint committee members, on the Seoul meeting.
	- Comments by John Hurley, NAS, on plans for the meeting.
	- General Discussion
5:00 p.m.	- John Hurley available to discuss individual travel and administrative arrangements and matters.

Workshop Participation

Participation in the workshop sessions involved the 7 NAS panel members, about 55 Korean participants and joint committee members, the UNESCO Science Education Advisor to the Ministry of Education (M. K. Bowker), and 3 USAID/Korea officials (Science Advisor, Newman Hall; Education Officer, William M. Williams; Engineering Officer, James K. Thomas).

The NAS panel members represented a considerable reservoir of experience in science, technology, and public policy. Panel chairman Franklin Long, a member of the NAS, is a chemist with experience in academia, government, and private industry, and a long involvement with matters of public policy and problems of development. He served on the 1972 NAS advisory team to Korea. Brewster Denny, dean of a graduate school of public affairs, writes widely on science and public policy, coordinates marine affairs at his university, and has been actively involved in other NAS programs in developing countries. George Herbert is president of a major private research institute and has had an active concern with problems of industrial-research management in developing countries, including Korea. David Ford is an electrical engineer with long experience in the problems of industrial R & D and an active interest in technical education and training. Grant Gross is in charge of the oceanography section of the National Science Foundation, has been actively involved with research in the marine sciences,

and has participated in previous NAS workshops abroad. Philip Powers is a scientist and educator with long experience in energy R & D in universities, government, and industry. Norman Wilimovsky is a specialist in northern Pacific fisheries and has worked with government fisheries agencies, as well as in research and teaching. He has participated in previous NAS workshops.

The Korean participants represented the following institutions:

1. Various departments of seven national ministries, including the ministries of Agriculture, Commerce and Industry, Culture and Information, Education, Home Affairs, Science and Technology, and Transportation, plus the Office of Rural Development and the Office of Central Meteorology.

2. Research institutes and scientific organizations, including the Korea Federation of Scientific and Technological Societies, the Korea Scientific Promotion Foundation, Korea Atomic Energy Research Institute, Korea Development Institute, Korea Industrial Development Research Institute, Korea Petroleum Industrial Development Center.

3. Institutions of higher learning, including the Korea Advanced Institute of Science, Korea University, Pusan Fisheries College, Seoul National University, Sogang University, Soong Jun University, and Yonsei University.

4. Korea Electric Company.

5. Seoul Shinmun (newspaper).

The Korea participants were highly competent scientists, engineers, planners, and administrators. Since about half of all the participants attended only the sessions related to their area of professional responsibility, the sessions were of a manageable size. There was opportunity for all participants to contribute to the discussions, and most did so.

Since the inaugural meeting of the Korea - U.S. Program of Scientific Cooperation concerned, to a considerable extent, the identification of topics for future, more intensive consideration, it was necessarily a meeting of more immediate interest to government than to private-sector participants. At future workshops, however, it probably would be both helpful and politic to have a significant level of private-sector participation. Similarly, it would be helpful for the NAS to place additional members from private industry on its portion of the joint committee.

Organization of Workshop Sessions and Joint Committee Meetings

The Technical Cooperation Bureau of MOST did an excellent job in preparing for the joint committee meetings and workshop sessions. The overall concept was sound, and the host of details associated with such a meeting were anticipated and necessary arrangements made.

All meetings were held in a large conference room at MOST, which occupies the 17th floor of a large, modern government building in the heart of Seoul. The site was just 10 minutes away from the Chosun Hotel, where the NAS group stayed; across the street from the USAID offices; and immediately accessible to the staff-support facilities of MOST. The USAID mission provided transportation for getting NAS participants to and from meetings.

The hospitality of the Korean participants was more than generous, and the NAS group felt that almost any way of conveying their appreciation was inadequate. Luncheons and dinners provided a pleasant exposure to Korean cuisine and customs and afforded a useful opportunity for the U.S. and Korean participants to become rather well acquainted with one another. This will be an important asset for future meetings in the cooperative program.

Because the overall schedule, as is almost inevitable at meetings of this nature, was very full, the NAS group had little time for reflection on the week's events. To allow for some interaction and exchange of views, the chairman invited the group to have breakfast in his room each day. Besides this hour together each morning, the NAS panelists had one working lunch at the end of the week and several short evening meetings. Each member also was responsible for drafting a statement of observations and recommendations on particular aspects of the week's deliberations.

English was used as the working language at joint committee and workshop sessions; this seemed to be a practical arrangement. Workshop sessions began with several background presentations, which took 25 - 30 percent of the time available for a particular topic - for a broad, multitopic initial meeting, probably a reasonable use of time. At subsequent meetings in the program of cooperation, however, it will be desirable to decrease the time alloted to presentations.

As mentioned previously, NAS panel members were able, during workshop sessions in which they were not directly involved, to visit a number of institutions and individuals for further background meetings. These useful supplementary visits were arranged during the first day or two of the week's meetings. Yet, the short lead time meant, in some cases, that particular persons were not available or there was not enough time to provide an adequate advance explanation of the purpose of the visit. At future meetings it probably will be helpful to arrange most of these individual background visits several weeks in advance.

Press Coverage

The science editor of a local newspaper, Seoul Shinmun, participated in one workshop session, and press coverage of the week's meetings was fairly active. Appendix C shows some clippings from the English-language press.

Perspective

The November meeting launched the program of scientific cooperation between MOST and the NAS. In retrospect, it seems to have been a useful and effective beginning. Topics for future consideration were identified clearly. A helpful exchange of ideas took place among the participants on several issues of considerable importance to Korea's scientific and technological development. And finally, but not of least importance, professional contacts and personal friendships were established and reinforced between the Korean and U.S. groups.

Continuity of participation is of great value to this sort of cooperative program. It is important for the U.S. participants to develop a core of knowledge and experience concerning scientific and technical developments in Korea. It is important for the Korean participants to develop a sense of ease and frankness in dealing with their U.S. counterparts, and to understand both the limitations of such a program and the ways it can be used most effectively. With this in mind, three of the current four NAS members of the joint committee have had previous experience in Korea, and the majority will be asked to serve for several consecutive years. At the staff level, MOST and BOSTID staff have had regular contact for 2 years and maintain a fairly active correspondence.

Now that two future workshops have been proposed for the cooperative program, it will be important to maintain the interest and continuity now established by making firm plans as expeditiously as possible. Timing and financial support are the two major factors that must be worked out. With respect to timing, it has been suggested that the first workshop might be on energy and that late July or early August 1974 might be appropriate times. The workshop on ocean resources might then be held in the late fall of 1974, in conjunction with the second annual meeting of the joint committee. Financial support for NAS participation may well come from several sources, including MOST. The proposals on timing and financial support are still tentative, however.

An essential feature of the NAS's activities in Korea so far has been the opportunity for contact with the Minister of Science and Technology. His overall perspective is highly important in helping NAS panel members assess the significance of particular issues, problems, and relationships. Minister Choi met with the NAS participants at the beginning of the meeting, saw them on several occasions during the week, then had a long final session with them on November 17. In the same vein, two substantial meetings with the USAID/Korea Mission Director, Mr. Adler, were most helpful.

A country with very limited natural resources, Korea must rely on the ingenuity and productivity of its people to

achieve its ambitious social and economic goals. Science and technology are critical tools which must be strengthened and used well if these goals are to be achieved. Remarkable support and emphasis have been given to science and technology so far, and it is hoped that the Korea - U.S. Program of Scientific Cooperation will help to strengthen and expand this vital sector.

APPENDIX A

FIRST WORKSHOP
OF THE
KOREA - U.S. JOINT CONTINUING COMMITTEE
Seoul, Korea
November 13 - 16, 1973

Briefing Papers

1. Kwa Hak-Hwa Movement
   Baek Yeong Hak (MOST)

2. Activities of the Corps of Technical Support for the New Village Movement and Project: Jwa Boo-Ri Village
   Cho Kyong Chul (Yonsei University)

3. National Technical Qualification System and Skill Classification System in Korea
   Bang Suk Mok (MOST)

4. Science Education in Korea
   M. K. Bowker (Science Education Advisor, Ministry of Education)

5. Long-Term Energy Demand and Supply Plan in Korea
   Baik Young Hoon (Korea Industrial Development Research Institute)

6. Korean Electricity Status and Prospects
   Shin Ki Jo (Korea Electric Company)

7. Trends in Electric Power Requirements and Generation Capacity in Korea
   James K. Thomas (USAID/K)

8. Present Status and Future Prospects for Peaceful Uses of Atomic Energy in Korea
   Lee Byoung Whie (MOST)

9. Farming and Fishing Village Fuel Supply Plan
   Lee Duk Sun (MOST)

10. Prospects of Technology Development for an Effective Use of Energy in Korea
    Choo Chai Yang (KAERI)

11. Current Activities for the Korean Agencies of Ocean Resources:

    Marine Geology Division, Geological and Mineral Institute under Ministry of Commerce and Industry
    Kim Chong Su (MOCI)

    Hydrographic Office, Ministry of Transportation
    Kim Mun Son (MOT)

    National Fisheries Research and Development Agency
    Choi Ik Sung (Office of Fisheries)

The Oceanological Society and College
Chang Sun Duk (Busan Fisheries College)

12. Status and Establishment Plan for the Korean Ocean Research and Development Institute
Lee Johng Wha (KIST)

13. University Participation in National Development in Korea
Lee Hahn Been (Soong Jun University)

14. Proposal on the Establishment of a National Science Education Foundation in Korea
Kim Chung Hum (Korea University)

APPENDIX B

FIRST WORKSHOP OF THE KOREA - U.S. JOINT CONTINUING COMMITTEE

Korean Participants*

BAE SOON HOON, Professor, KAIS

BAEK YOUNG-HAK, Director, Program Development and Promotion Bureau, MOST

BANG SUK MOK, Manpower Planning Directorate, MOST

CHANG SUN KUK, Professor, Busan Fisheries College

CHO BYONG HA, Professor, KAIS

CHO KYONG CHUL, Professor, Yonsei University

CHO KYONG MOK, Chief, Promotion Division, Program Development and Promotion Bureau, MOST

CHOI CHONG HO, Deputy Director, Saemaule Project, Ministry of Home Affairs

CHOI CHONG MYUNG, Assistant Minister for Resources, Ministry of Commerce and Industry

CHOI IK SUNG, Director, National Fisheries, Research and Development Agency, Office of Fisheries

CHOI KYU WON, Professor, College of Liberal Arts and Science, Seoul National University

CHOO CHAI YANG, Vice President, KAERI

CHUNG KUN MO, Professor, Korea Advanced Institute of Science

CHUNG TAE SOO, Director, Academic Affairs Coordinator's Office, Bureau of Higher Education, MOE

HAN WOOK DONG, Chief, Agricultural Engineering Division, Institute of Agricultural Engineering and Utilization, Office of Rural Development

HYUN WON BOK, Science Editor, The Seoul Shinmun

JEONG WOON SOU, Councilor for Science and Technology, MOST

*See chapter III for Korean members of joint committee and NAS participants.

JOHN YONG WON, Associate Professor, Seoul National University

KANG WOONG-KI, Professor, College of Science and Technology, Korea University

KIM CHONG KU, Director, Meteorological Division, Office of Central Meteorology

KIM CHONG SUK, Director, Marine Geology Division, Geological and Mineral Institute, Ministry of Commerce and Industry

KIM CHUNG HUM, Professor, Korea University

KIM DUK HYUN, Councilor for Science and Technology

KIM HO, Chief, Energy Development Division, MCI

KIM MUN SON, Chief, Oceanography Section, Hydrographic Office, Ministry of Transportation

KIM YOON HYUNG, Senior Fellow, KDI

KIM YOON KIE, President, Korea Federation of Scientific and Technological Societies

LAH UNNY, Chief, Research Division, Korea Petroleum Industrial Development Center

LEE BYOUNG WHIE, Director, Atomic Energy Bureau, MOST

LEE CHANG KUN, Manager, Reactor Division, KAERI

LEE CHONG SOO, Press Officer, MOST

LEE CHUL JOO, Professor, Yonsei University

LEE CHUNG OH, Professor, KAIS

LEE DUK SUN, Resources Development Directorate, MOST

LEE JOHNG WHA, Investigator, Ocean Research and Development Institute, Korea Institute of Science and Technology

LEE SHY BANG, Director, Bureau of Science Education, Ministry of Education

LEE WON KOO, Chief, Technical Information Division, KAERI

PAIK YOUNG HOON, Director General, Korea Industrial Development Research Institute

PARK BYONG KWON, Investigator, Ocean Research and Development Institute, KIST

PARK JONG KUK, Director, Bureau of Information, Ministry of Culture and Information

PARK WON HEE, Head, Chemical Process Development Laboratory, KIST

PARK YONG AHN, Professor, Oceanography Department, Seoul National University

RHO CHAE SHIK, Head, Environmental Research Laboratory, KAERI

SHIM JONG SUP, Professor, College of Agriculture, Seoul National University

SHIM SUNG TAIK, Managing Director, The Korea Science Promotion Foundation

SHIN KI JO, Vice President, Korea Electric Company

YANG KYUNG RIN, Head, Radio Analytical Division, KAERI

APPENDIX C

SELECTED PRESS COVERAGE
OF THE
KOREA - U.S. JOINT CONTINUING COMMITTEE FIRST MEETING AND WORKSHOP
Seoul, Korea
November 13 - 18, 1973

U.S.-ROK Science Panel Opens

The first Korea-U.S. science and technology cooperation committee opens today at the Ministry of Science and Technology with prominent local and American scientists attending.

Dr. Franklin A. Long, special professor at Cornell University, arrived here yesterday leading seven members of the National Academy of Science (NAS) for the four-day discussions.

Dr. Choi Sang-op, vice dean of Sogang University, will co-chair the committee with Dr. Long, representing the nine-man Korean team.

The participants will exchange information and opinions on pending scientific and technical issues in Korea while establishing detailed plans for effective Seoul-Washington cooperation.

The Korea Times
Tuesday,
November 13, 1973

Korea Times Ph

Dr. Franklin A. Long, a professor at Cornell University in the United States, addre the first meeting of the Korea-U.S. Joint Committee for Scientific Cooperation. Dr. L leads the American representatives to the Ministry of Science and Technology-spons meeting.

Korea-U.S. Science Panel

'Mutuality Needed In Cooperation'

"Scientific and technical cooperation between two nations, if it is to be effective, should be mutual," said Dr. Franklin A. Long yesterday in an opening speech to the Korea-U.S. Joint Continuing Committee for Scientific Cooperation.

The first meeting and workshop, sponsored jointly by the Ministry of Science and Technology and the National Academy of Science (NAS) of the United States began with seven NAS members and nine local scientists attending.

The participants will discuss problems popularizing science and technology in Korea, national energy research and development policies, the development of ocean research and the role of academia in national development in the four-day discussions.

Co-chairing the meeting with Dr. Long, vice president of Sogang University Dr. Choi Sang-up emphasized the need for building an indigenous scientific and technological capability to cope with emerging national problems.

In a congratulatory address, Minister of Science and Technology Choi Hyung-sup said Korea-American friendship can now be further broadened and strengthened by the establishment of the joint committee to promote the advancement of science and technology.

"The advancement of ... standing and participati... all the people in scientif... velopment and the esta... ment of diverse specific ... for support of industry a... source development," the ... ister said," are the two ... of the nation."

The participants in the ... joint meeting visited yest... afternoon the Korea Adv... Institute of Science, Kore... velopment Institute and ... Institute of Science and ... nology.

The Korea Times, Wednesday, November 14, 1973

Joint Committee

ROK, U.S. Scientists Study Sea Resources

By Kim Ji-myung

Korea now has a real opportunity to establish an effective system for studies of marine resources and their exploration, it was pointed out in the four-day meeting of the Korea-U.S. Joint Committee for Scientific Cooperation this year.

The first gathering of the bilateral committee indicated the nation is now in a most proper stage to form an interministerial coordination organization for the issue with basic departmental work done.

Both Korean and U.S. scientists have agreed to establish a new workshop session for intensive study and information exchange on the growing issue of the energy crisis in addition to four other established sessions.

The first meeting of the committee marked the official start of scientific and technical cooperation between the two nations.

The continuing committee was organized in February this year by Science-Technology Minister Choi Hyung-sup for Korea and Dr. Philip Handler, chief of the U.S. National Academy of Science.

Seven representatives of the NAS, headed by Dr. Franklin A. Long had four days of general review of the Korean situation and frank discussions with local scientists and officials concerned.

After studying four major issues — science and technology popularization in Korea, national energy research and development policies, the development of ocean resources and the role of academia in national development — the participants of both nations agreed to meet again next year for continued consideration of important problems.

"A working unit with the prestige of NAS will now be ready to answer our request for help with most up-to-date scientific information and relevent studies applicable here," said Kim Yong-gi, director of the Technical Cooperation Bureau of the sponsoring Ministry of Science and Technology (MOST).

Praising the ambitious work of the Korea Atomic Energy Research Institute, the American experts pointed out the importance of priority of programs in view of limited manpower and funds.

On the science-technology popularization drive, an effective and systematic approach such as integrating the program with the already organized units of the New Community Movement was recommended. Use of a well-designed pilot project was also proposed.

In relation to ocean resources, policy makers of the nation were advised to take a serious look at the legal aspects of the problem. Training legal experts in marine affairs would be helpful, the sooner the better for Korea, it was agreed.

As for the role of universities in national development a non-governmental but government-supported research foundation was recommended.

The Korea Times
Sunday, November 18, 1973